What is claimed is:

1. A fuel injector comprising:

a body having an inlet port, an outlet port and a fuel passageway extending from the inlet port to the outlet port along a longitudinal axis;

a metering element disposed proximate the outlet port;

an actuation element having a proximal end and a distal end, the proximal end being in operative contact with the metering element;

an electromagnetic coil; and

a compensator being coupled to the distal end of the actuation element, the compensator containing magnetically-active fluid, the magnetically-active fluid being responsive to magnetic flux so as to change the fluid from a first state to a second state.

2. The fuel injector according to claim 1, wherein the compensator comprises:

a sleeve extending between a first end and a second end along the longitudinal axis, one of the first and second ends having an opening and the other of the first and second end is closed;

a plunger extending between a first plunger end and a second plunger end along the longitudinal axis, the first plunger end being cinctured by the sleeve and spaced apart with a portion of the plunger by a clearance, the plunger having an opening formed on the plunger and extending into the plunger for a predetermined distance so as to form an interior volume;

a seal disposed between the sleeve and the plunger so as to define a first volume between the other of the first and second ends of the sleeve and the plunger;

a plunger guide having a fluid passage extending between a first guide end and a second guide end, one of the first guide end and second end being disposed at least partly in the interior volume of the plunger so as to define a second volume; and

a biasing member disposed between the plunger guide and the interior volume.

3. The fuel injector according to claim 2, wherein the electromagnetic coil generates at least a portion of the magnetic flux.

4. The fuel injector according to claim 1, wherein the electromagnetic coil is coupled to the actuation element such that the metering element is operative to move when the electromagnetic coil is energized.

5. The fuel injector according to claim 2, wherein the actuation element comprises a magnetostrictive member.

6. The fuel injector according to claim 5, wherein the magnetostrictive rod comprises a Terfenol-D alloy.

7. The fuel injector according to claim 5, wherein at least a portion of the magnetostrictive member is exposed to fuel.

8. The fuel injector according to claim 5, further comprising a biasing means operatively positioned to exert a predetermined prestress force on the magnetostrictive rod.

9. The fuel injector according to claim 8, wherein the biasing means biases the plunger away from the sleeve so as to cause magnetically-active fluid to flow between the second volume and at least one of the clearance and the first volume.

10. The fuel injector according to claim 2, wherein the actuation element comprises a piezoelectric stack.

11. The fuel injector of claim 10, wherein the charging voltage of the piezostack is used to maintain a current in the electromagnetic coil proximate the compensator.

12. The fuel injector according to claim 10, wherein the biasing means controls the amount of magnetically-active fluid passing through between the first volume and the second volume.

13. The fuel injector according to claim 2, wherein the first state comprises a liquid and the second state comprises the liquid in a substantially solidified state so that movement of the magnetically-active fluid between the clearance is reduced or prevented.

14. The fuel injector according to claim 2, wherein the first state comprises a fluid having a first viscosity and the second state comprises a second viscosity greater than the first viscosity so that movement of the fluid between the first volume, the clearance and the second volume is reduced or prevented.

15. The fuel injector according to claim 14, wherein the second viscosity comprises a viscosity approximately four orders of magnitude different from the first viscosity.

16. The fuel injector according to claim 2, wherein the body comprises an inlet assembly having the sleeve formed therein.

17. A method of supporting an actuator element in a fuel injector having a body with an inlet port, an outlet port and a fuel passageway extending from the inlet port to the outlet port, a metering element disposed proximate the outlet port, an actuation element having a proximal end and a distal end, the proximal end being in operative contact with the metering element, a compensator having a plunger disposed in a sleeve with a clearance between the plunger and

the sleeve, the compensator containing magnetically-active fluid disposed for movement within the compensator, and an electromagnetic coil, the method comprising:

changing the magnetically-active fluid in the compensator from a first state to a second state when a magnetic flux is generated; and

maintaining one end of the actuation element constant with respect to the compensator when the magnetic flux is generated.

18. The method according to claim 17, wherein the changing comprises changing a viscosity of the magnetically-active fluid from a first viscosity to a second viscosity greater than the first viscosity.

19. The method according to claim 17, wherein the changing comprises changing from a second state to a first state such that distortions of the fuel injector are compensated by the magnetically-active fluid in the first state.

20. The method according to claim 17, wherein the changing comprises reducing movement of the magnetically-active fluid in the compensator when the actuation element is actuated.

21. The method according to claim 17, wherein the maintaining further comprises providing at least one of a magnetostrictive member and piezoelectric stack so as to actuate the metering element.

22. The method according to claim 17, wherein the changing comprises energizing the electromagnetic coil so as to generate the magnetic flux.

23. The method according to claim 17, further comprising:

prestressing the magnetostrictive member with a predetermined prestress force; and

controlling flow of the magnetically-active fluid disposed in the compensator.